

# Lake Season Holiday Traffic Impacts to Capacity Planning

TEAM CONFERENCE

March 14, 2024



# Agenda

- Project background
- Purpose and need
- Preferred alternative
- Traffic data and trends
- Safety analysis
- Traffic modeling
- Q&A



# Project Location



# Purpose and Need - Safety



## ► Challenges

- Short WB on ramp (railroad bridge)
- Traffic queuing on ramps
- Closely-spaced intersections
- Truck volumes

# Purpose and Need – Congestion

- 70WB to U.S. 54



- Ramp Terminals

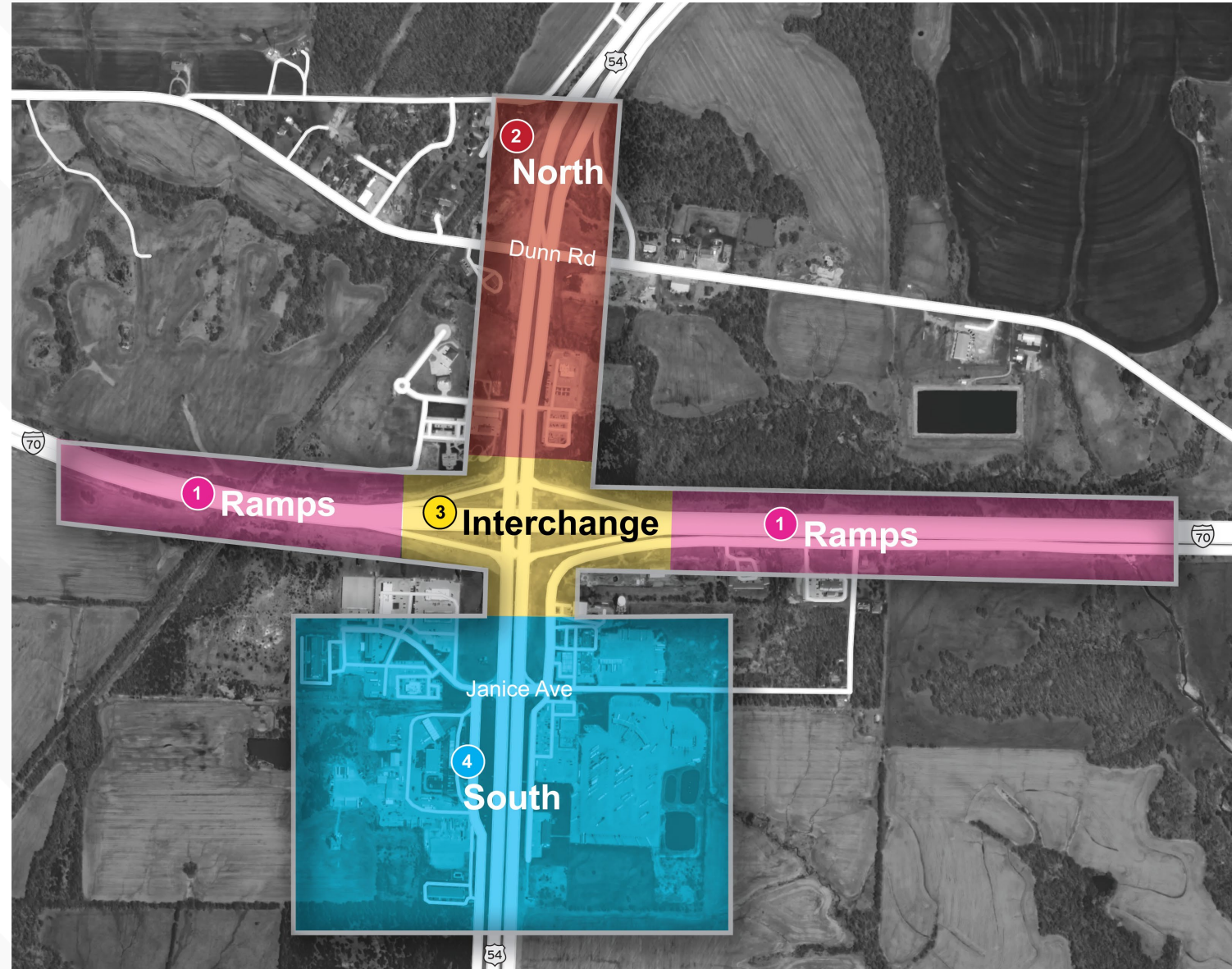


- Lane Utilization



# Overview and Preferred Alternatives

- 1** I-70 Ramps
- 2** North/Dunn Rd.
- 3** I-70/U.S. 54 Interchange
- 4** South/Janice Ave.



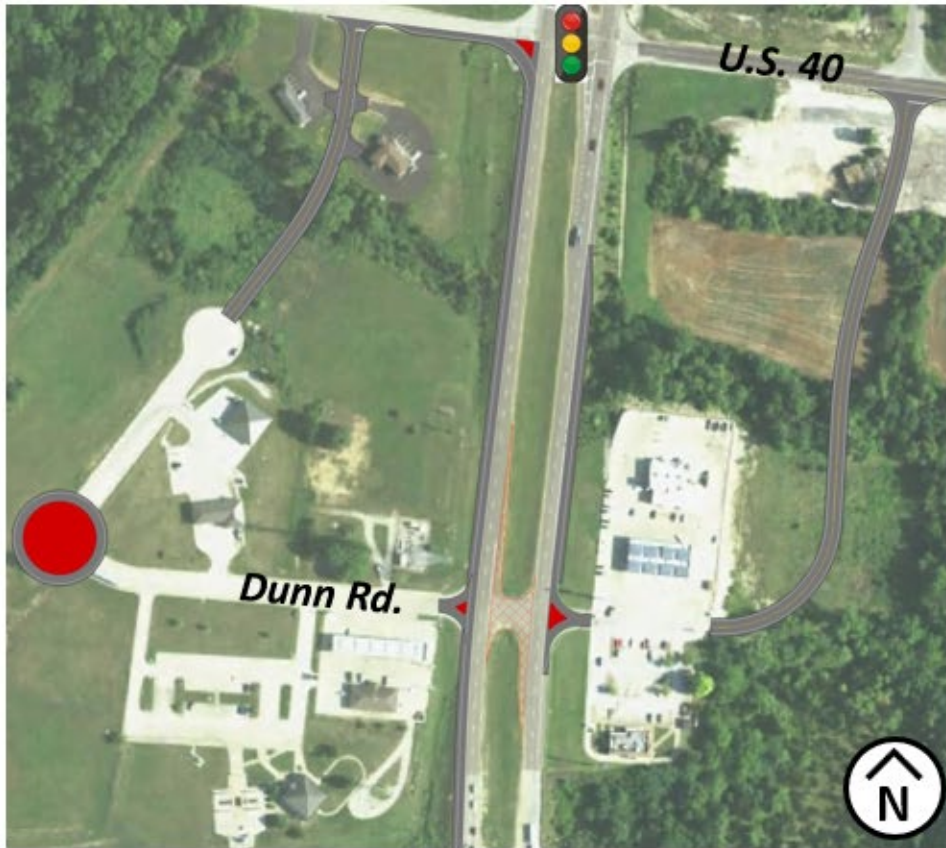
# I-70 Ramps: Preferred Alternative



## Preferred Alternative

- Entrance ramps extended 1,400 to 1,700 feet

# North/Dunn Road: Exploration



**Option #1:** Right-in/Right-out at Dunn Rd. and construct west & east backage roads



**Option #2:** Relocate Dunn Rd. and construct west backage road



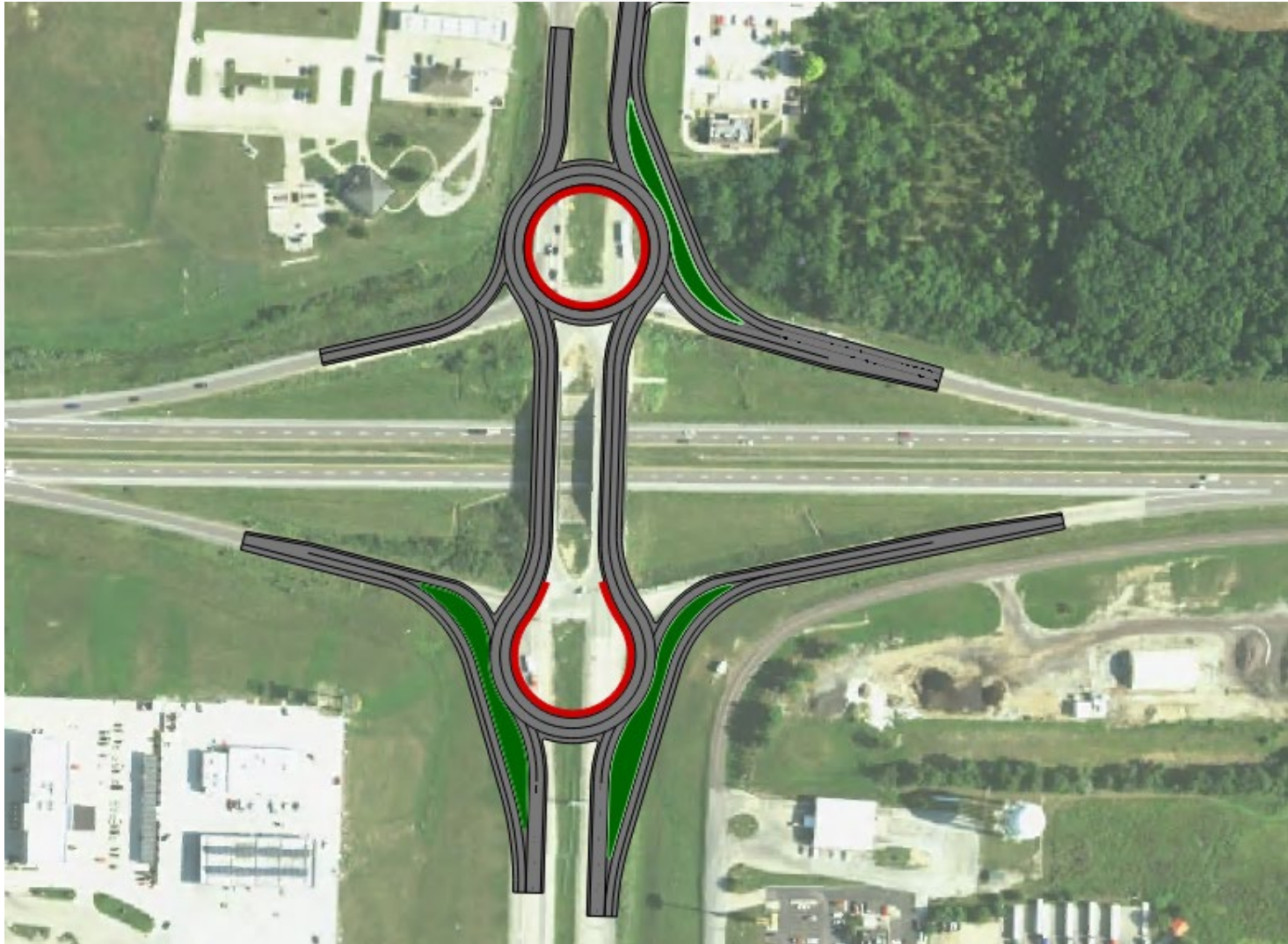
# North/Dunn Road: Preferred Alternative



## Preferred Alternative

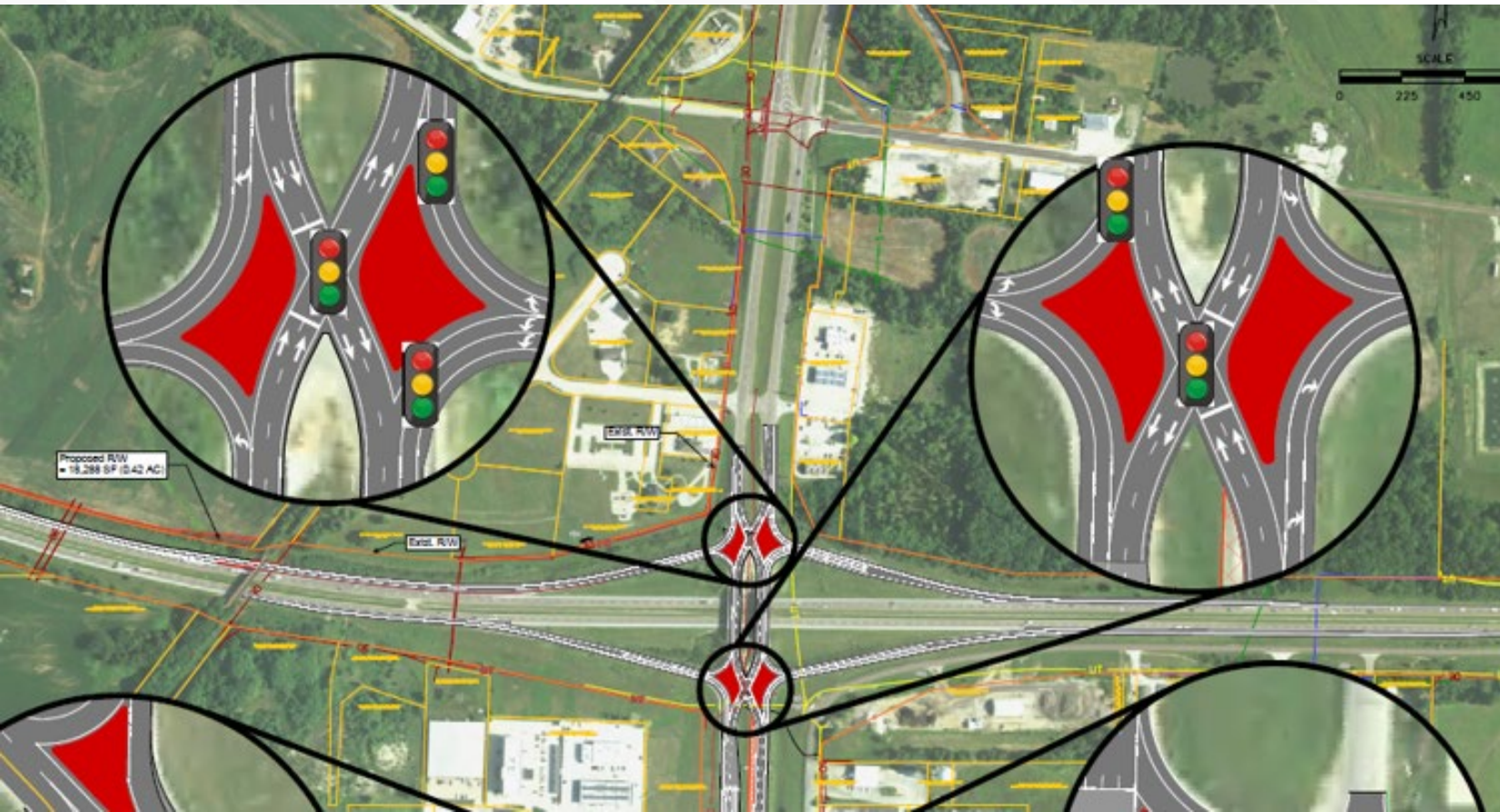
- Keep Dunn Road as-is, maintaining existing business access.
- Dunn Road has much lower traffic volumes and substantially fewer crashes than other areas of the study.

# I-70/U.S. 54 Interchange: Exploration



The team explored several solutions, including a double roundabout.

# I-70/U.S. 54 Interchange: Preferred Alternative



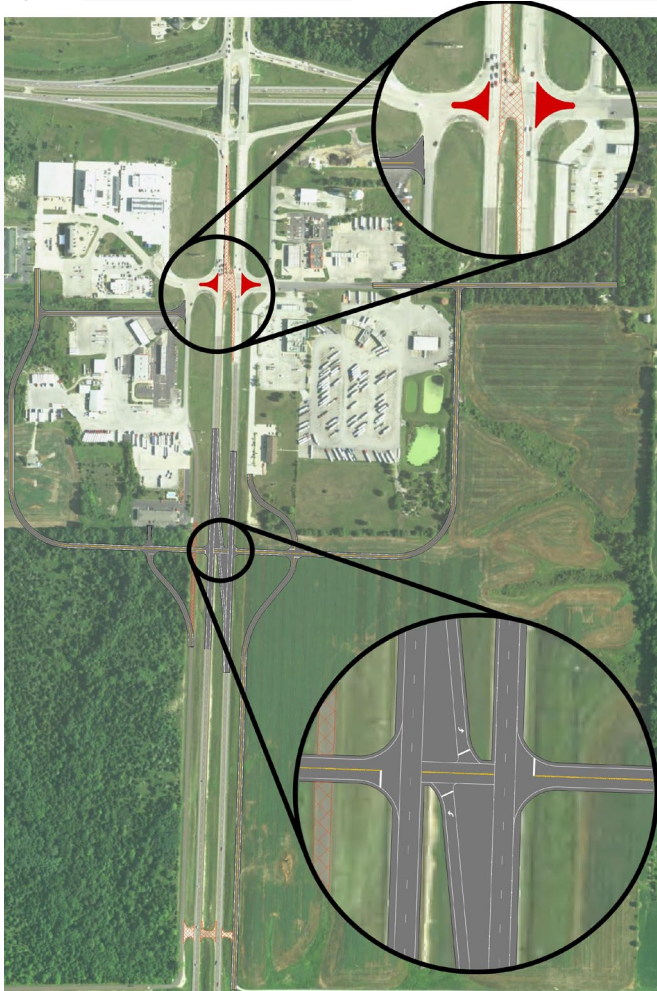
## Preferred Alternative: Diverging Diamond Interchange (DDI)

A DDI would:

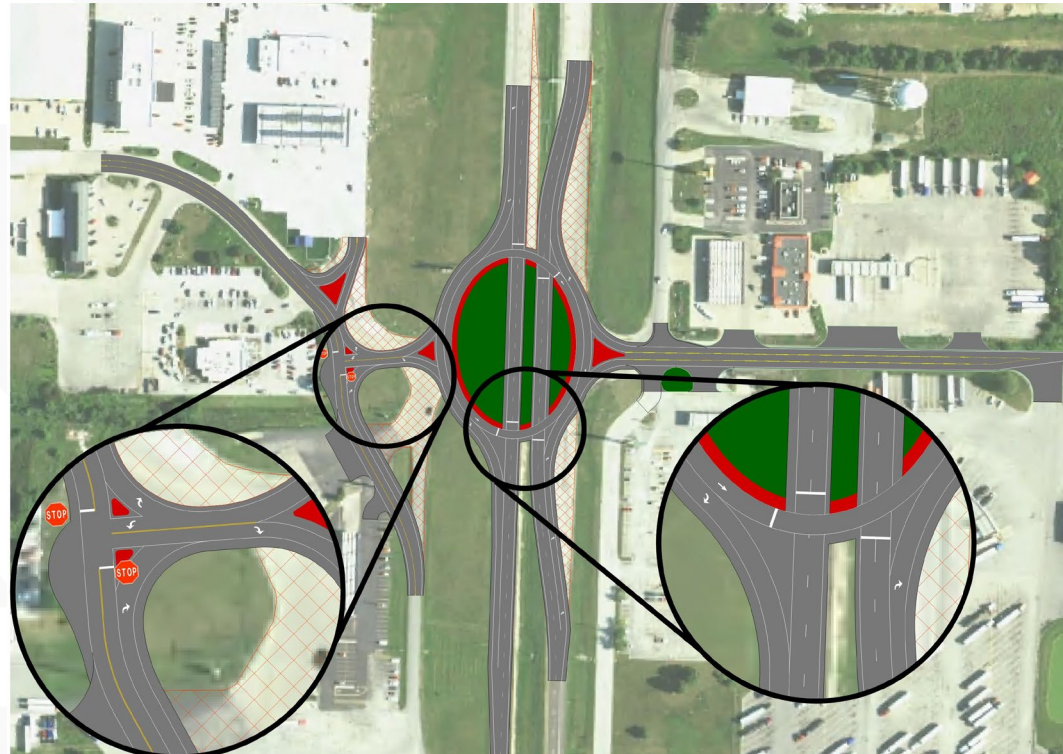
- Provide substantial safety benefits.
- Alleviate congestion and long turning lines that back up onto I-70 exit ramps.
- Offer the greatest cost/benefit value.

# South/Janice Avenue: Exploration

## Option #1: Janice Ave. Intersection Relocation

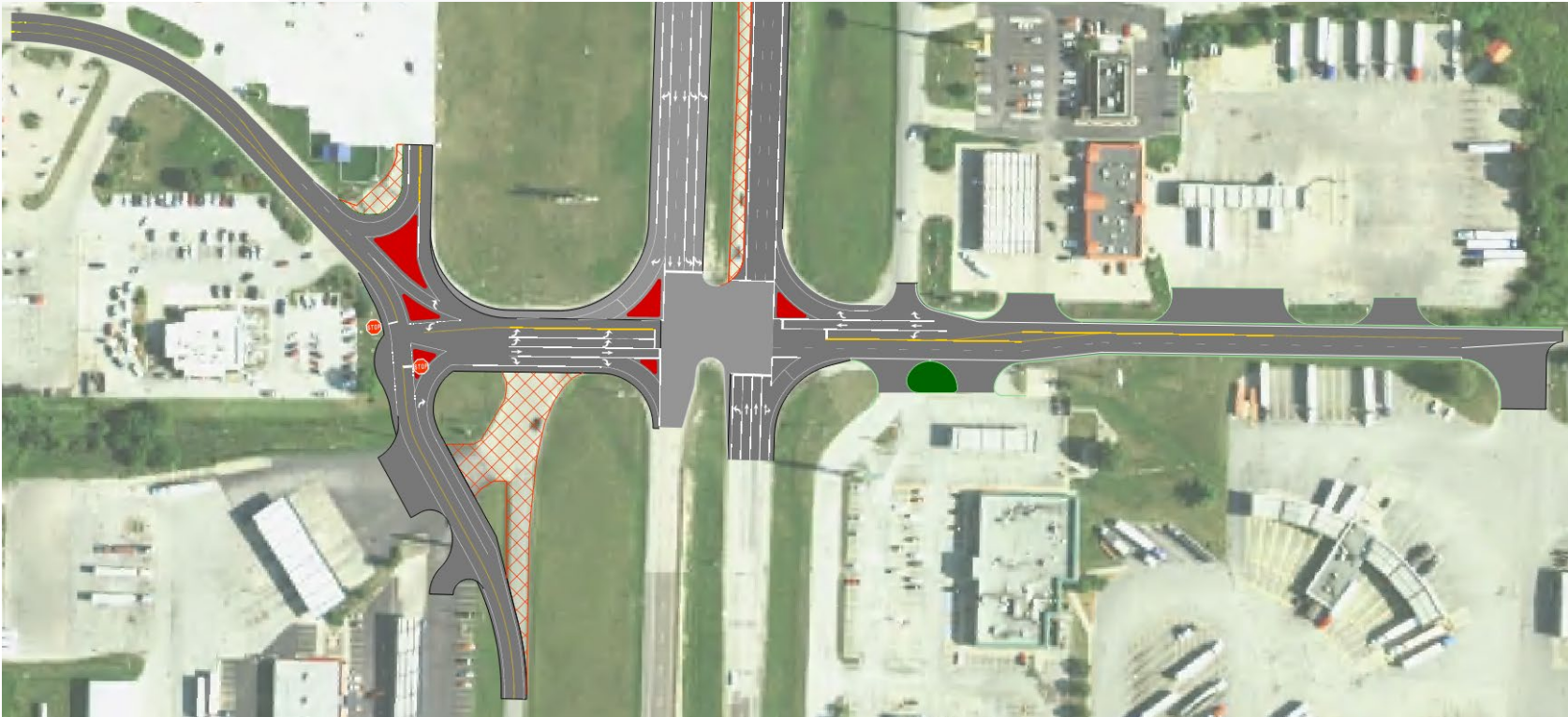


## Option #2: Janice Ave. Throughabout Intersection



The team explored several solutions, including relocating the intersection and a throughabout.

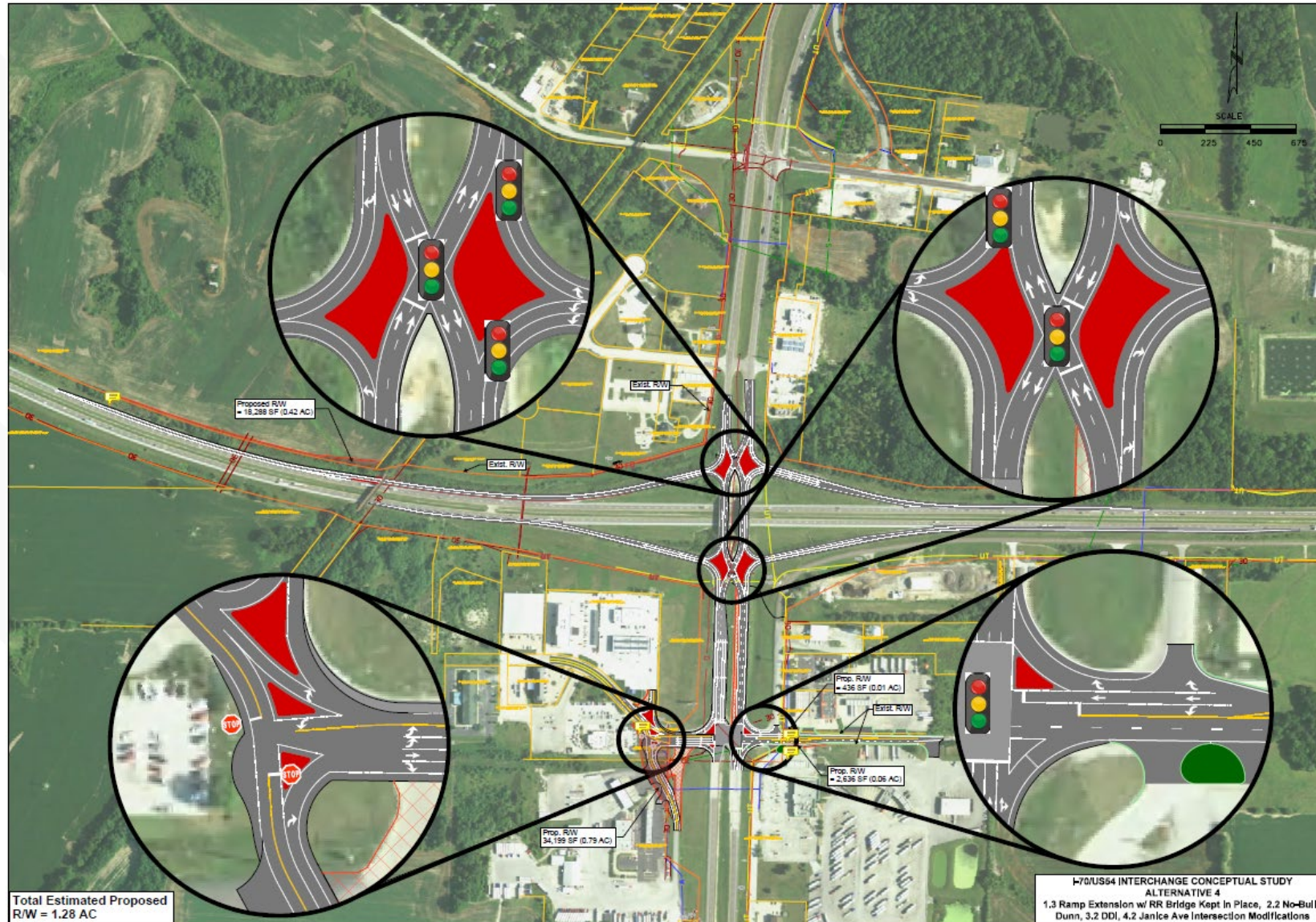
# South/Janice Avenue: Preferred Alternative



## Preferred Alternative: includes local road improvements.

- Improve traffic flow and alleviate congestion.
- Better accommodate side-by-side southbound left turns for trucks.
- Offer the greatest cost/benefit value.

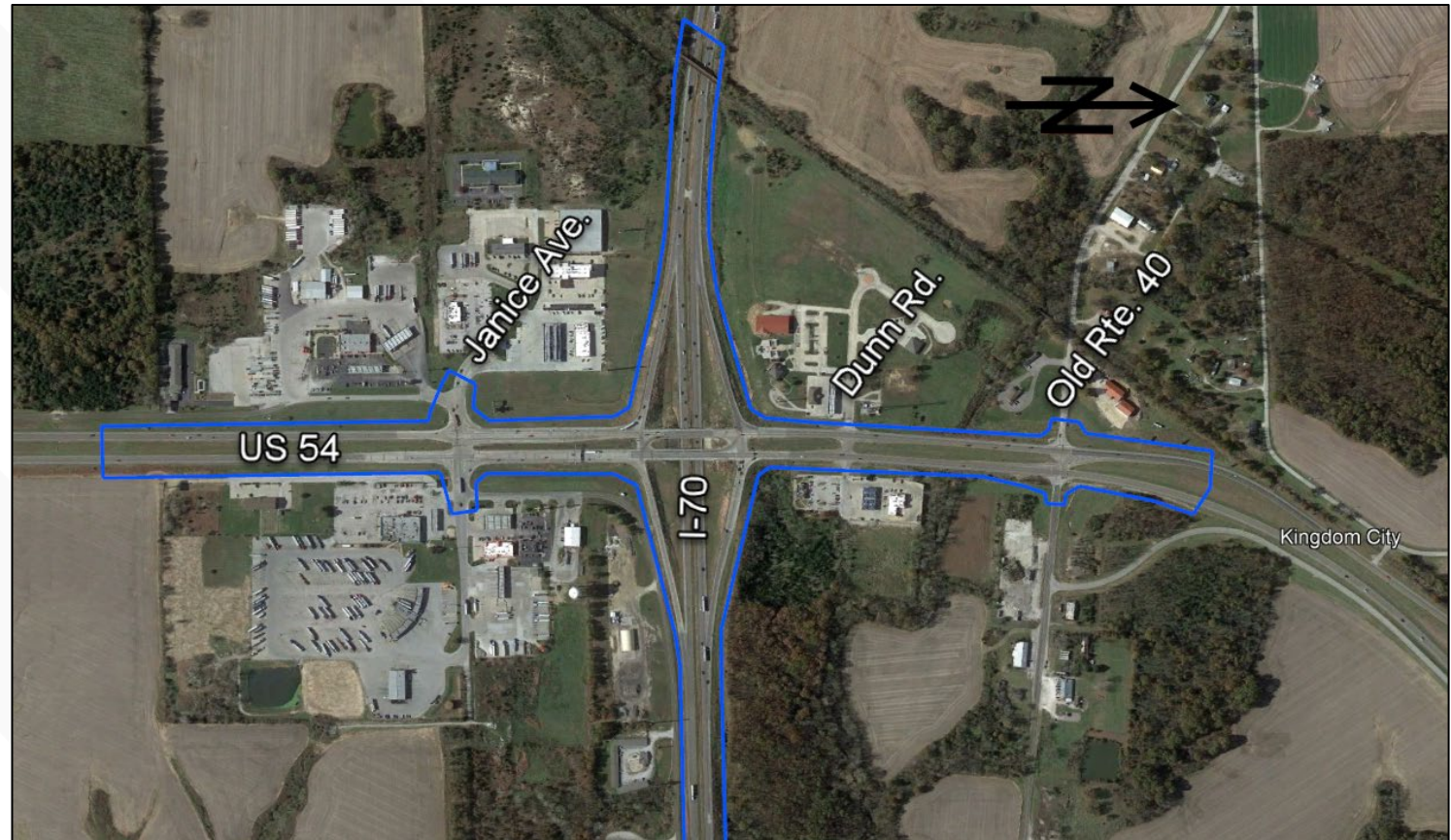
# Preferred Alternative



# Study Area

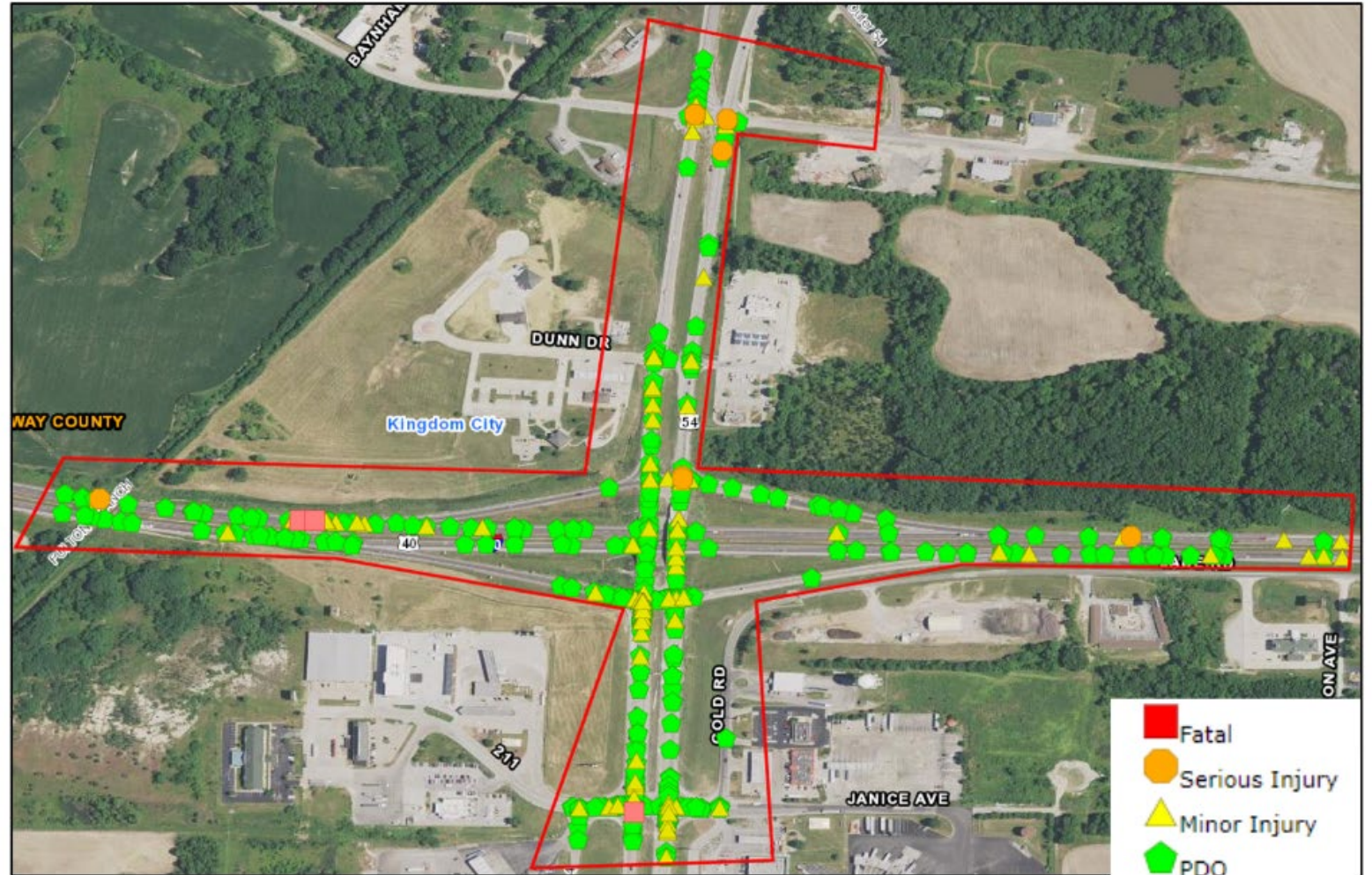
## ► Concept Development and Access Justification Report

- Location
  - ~18 miles east of Columbia
- Unique Circumstances
  - Heavy truck traffic
  - Lake area traffic
- Studied
  - W/F/Holiday
  - Opening year 2025
  - Ultimate year 2045



# Safety Analysis

- ▶ 10 yr. Crash History (737)
  - 3 Fatal
  - 7 Serious injury
  - 3 Suspected serious injury
  - 109 Minor injury
  - 615 Property damage only
- ▶ Of all Crashes, Trucks involved:
  - 2 Fatal
  - 20% Involved heavy trucks
  - 26% Passing
  - 25% Rear-end
  - 12% Out of control





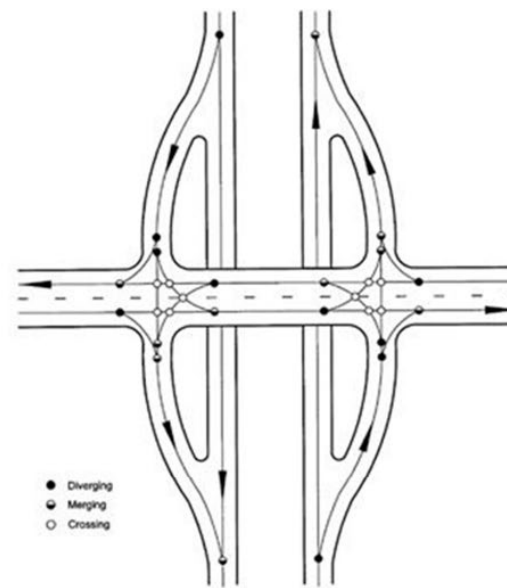
# Safety Analysis

## ▶ IHSDM

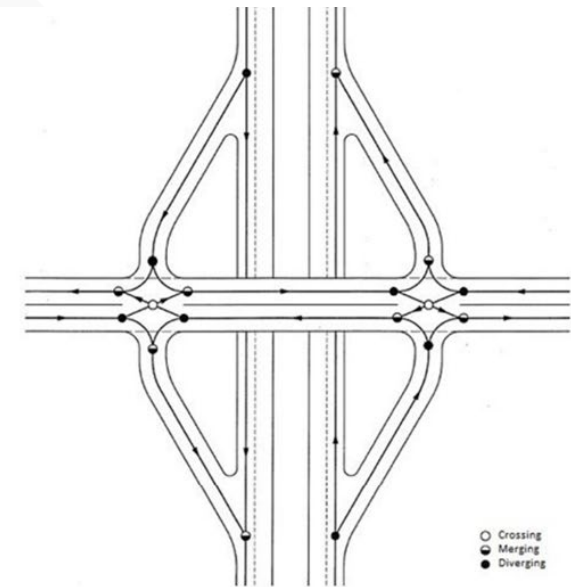
- Performance assessment compared to similar routes
- Sensitivity analysis for design options
- Has some limitations (innovative designs)
- Quick and dirty version with CMFs

## ▶ Conflict Points

- Interchange
- Janice



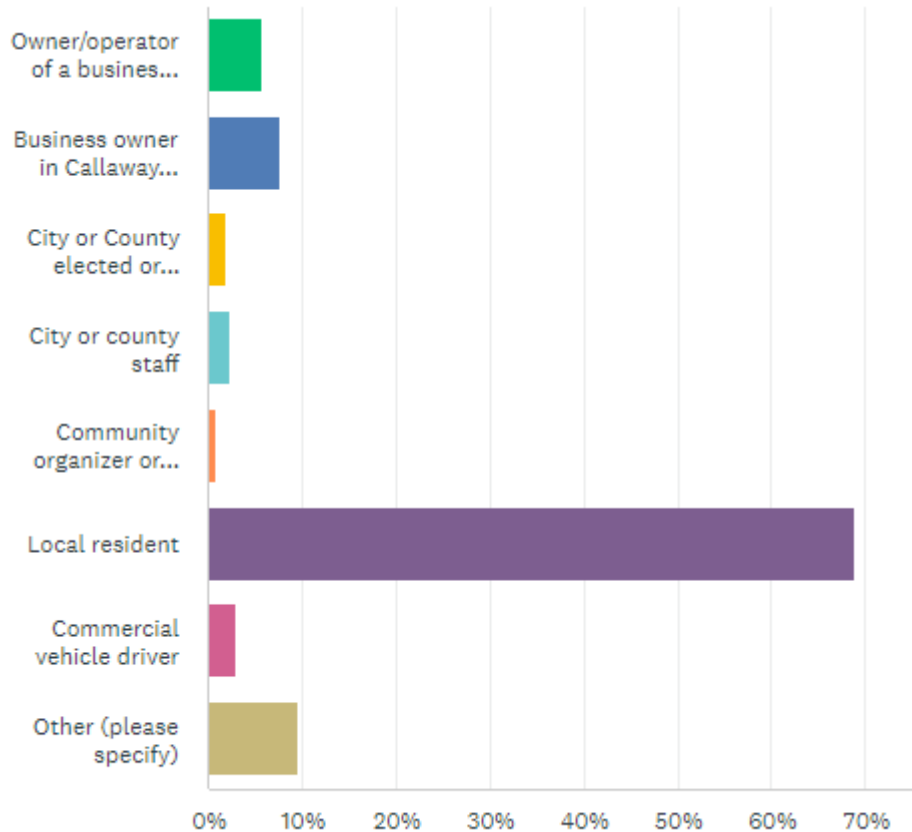
Angle (10) Merge (8) Diverge (8)



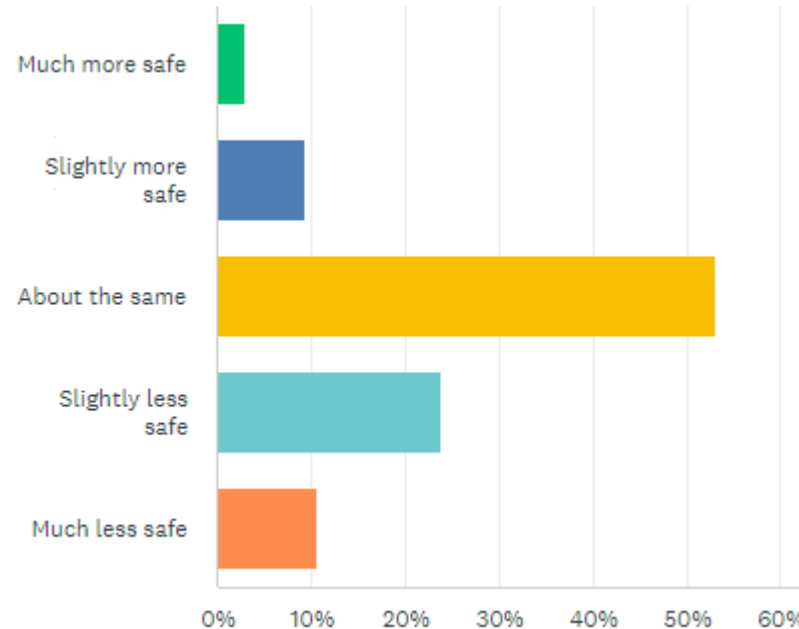
Angle (2) Merge (6) Diverge (6)

# Survey and Public Comments

## ▶ Survey Respondents



## ▶ Safety compared to other interchanges



### SurveyMonkey Safety Survey

- 400 responses!
- Open for about a month
- Promoted by MoDOT and stakeholder group

# Survey and Public Comments

## Top Safety Concerns

Signing and pavement markings to help drivers choose the correct lane or position	38.30%	144
Storage for turning vehicles (to prevent vehicles from blocking through traffic)	32.71%	123
Traffic backing down the ramps to I-70	31.12%	117
Difficulty merging onto I-70 from US 54 ramps	42.82%	161
Traffic backing up at intersections north and/or south of the interchange	46.01%	173
High speeds through the area	15.96%	60
Poor sight lines for movements at the interchange or nearby intersections	17.82%	67
Interactions between heavy trucks and passenger vehicles	47.87%	180
Interactions between motor vehicles and pedestrians/cyclists	7.71%	29
Wrong-way drivers	8.78%	33
No real safety concerns at this interchange	8.51%	32
Other (please specify)	Responses	8.24% 31

### Frequent topics in comments:

- Signal function/timing
- Panhandlers
- “On ramp not long enough westbound I-70 because of railroad bridge”
- Weekend traffic peaks/ lake traffic

# Traffic Data

- ▶ Gridsmart
- ▶ Streetlight Data
  - Origin-destination
  - Regional trends
- ▶ Traditional Counts
- ▶ Video Observations



2:54 PM  
9/3/2021

# Traffic Trends

## ► Janice

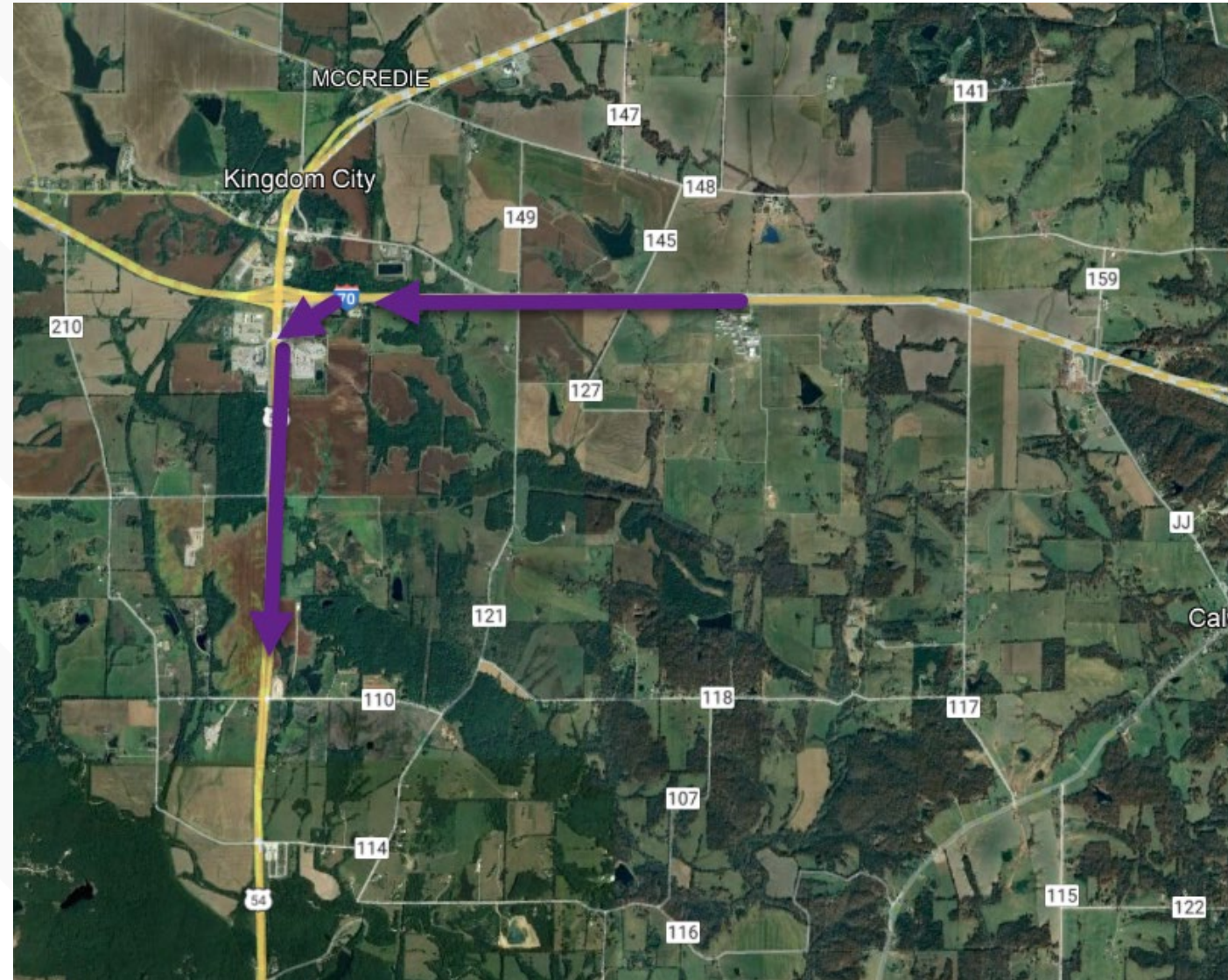
- Truck lane selection
- Closely spaced intersections
- Connecting businesses



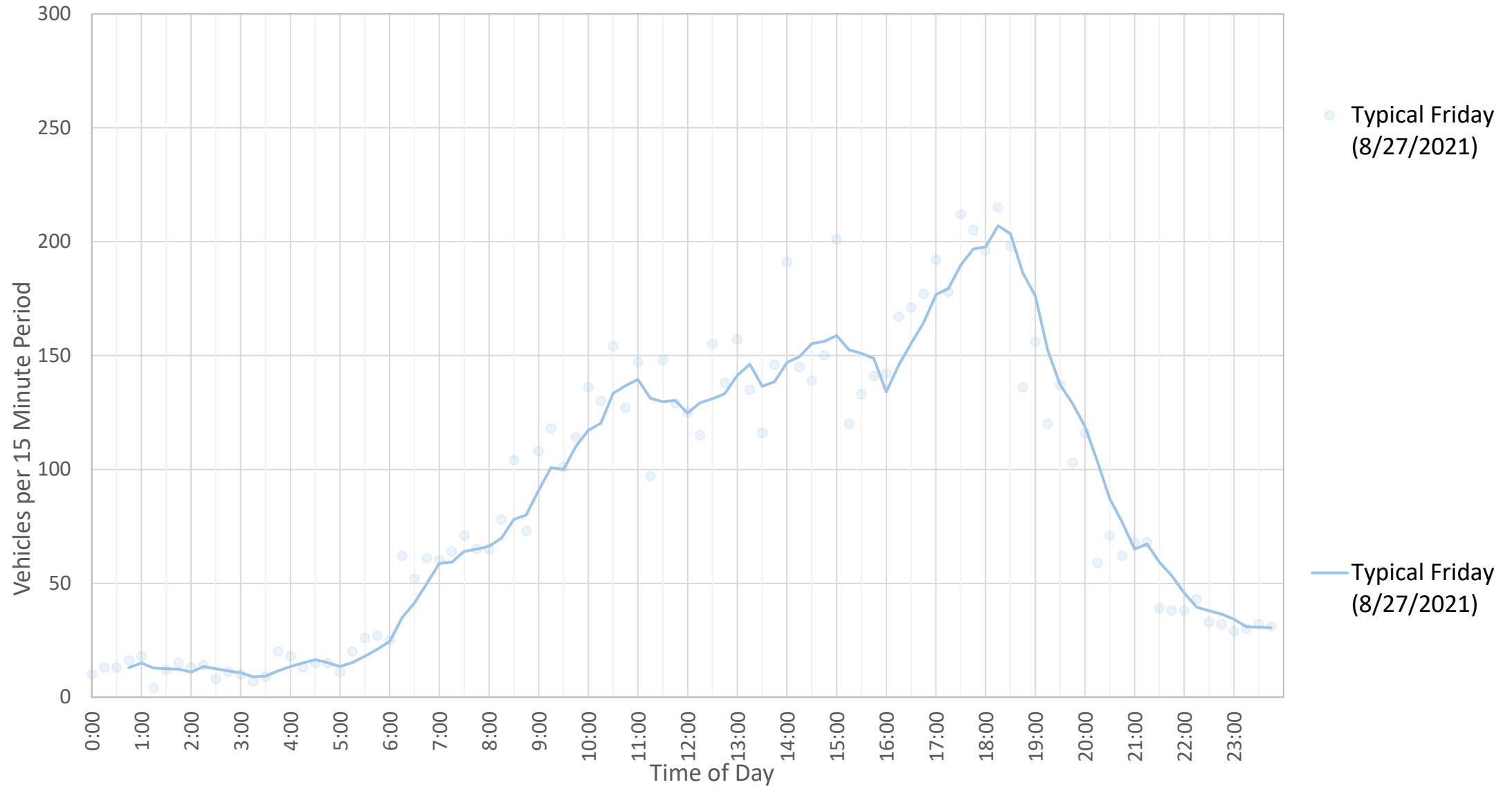
# Traffic Trends

## ► Pre Holiday/WB I-70 Off Ramp

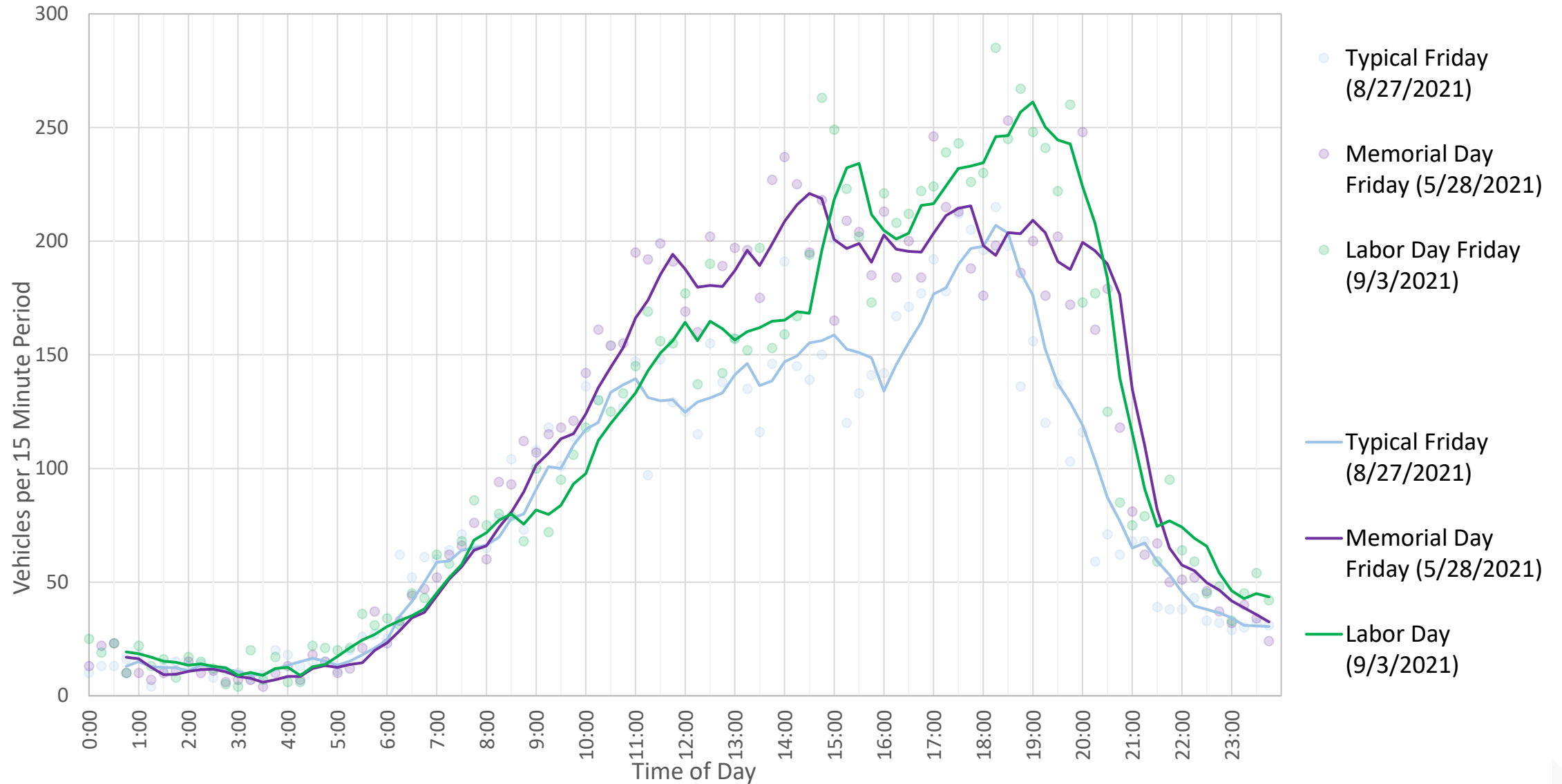
- Friday (to lake traffic)
  - +7.6% SB U.S. 54
  - +14.7% for NB U.S. 54
  - +37.1% for WB I-70 off ramp
  - +0.0% for EB I-70 off ramp



# Traffic Trends



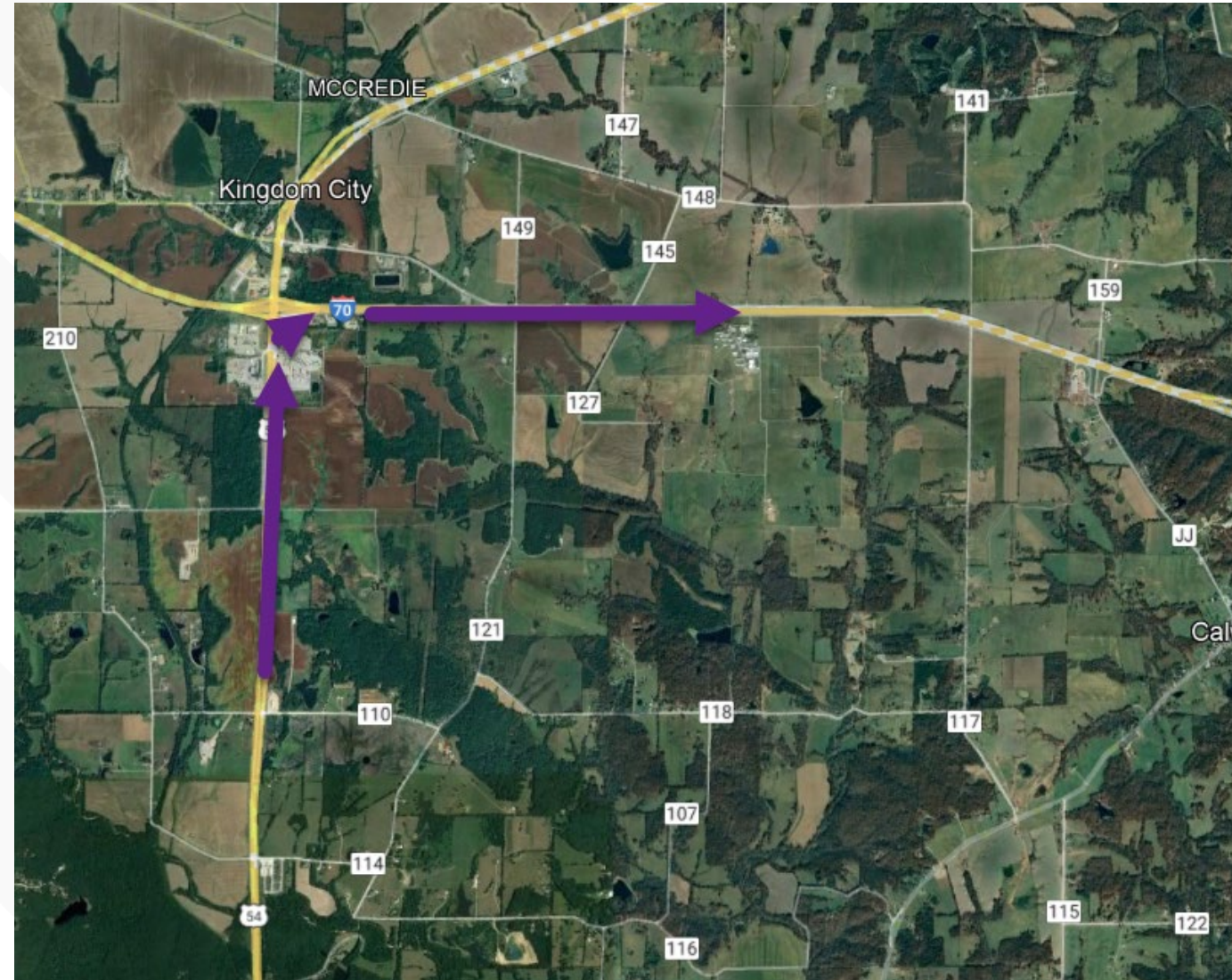
# Traffic Trends



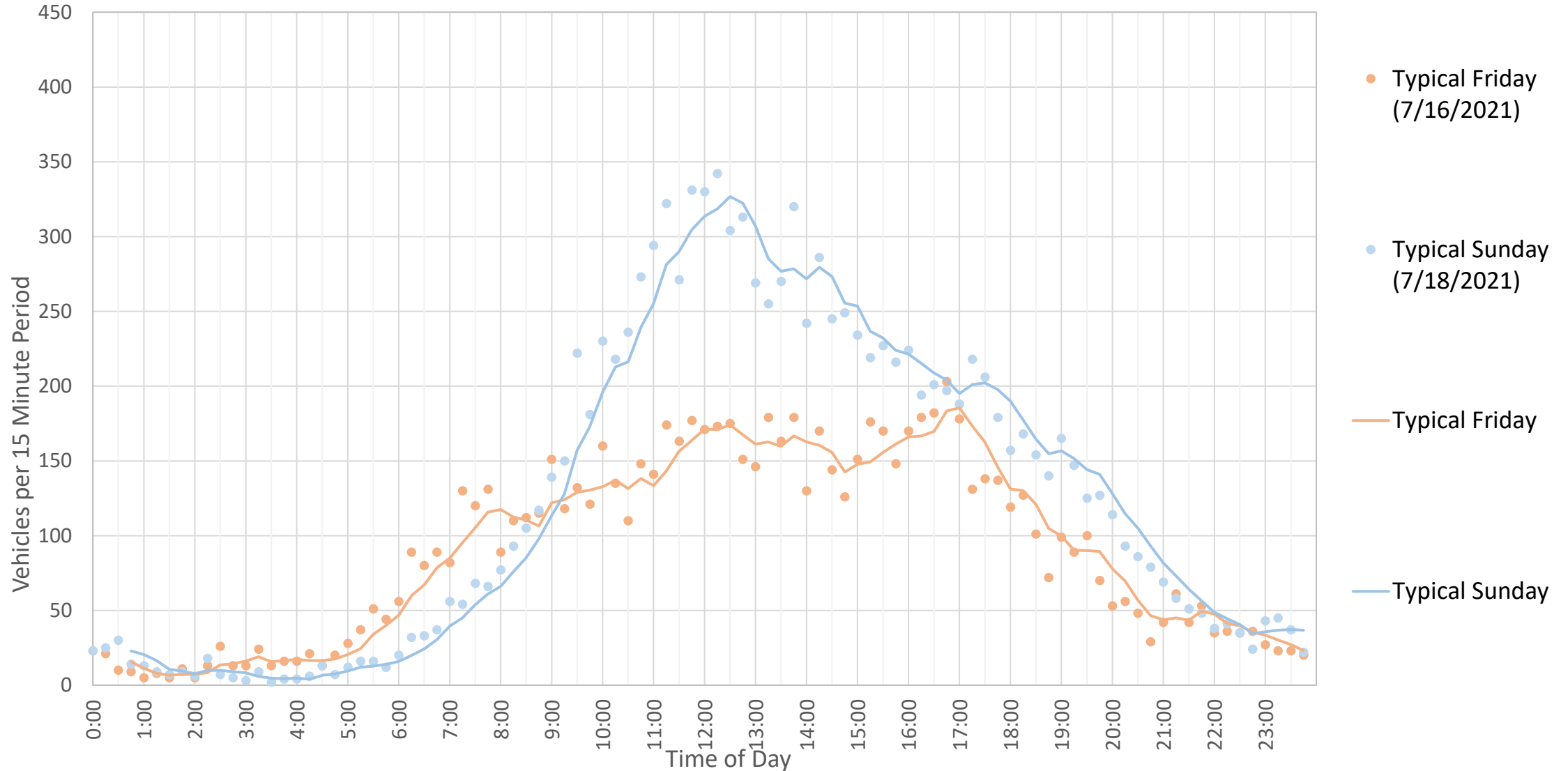


# Traffic Trends

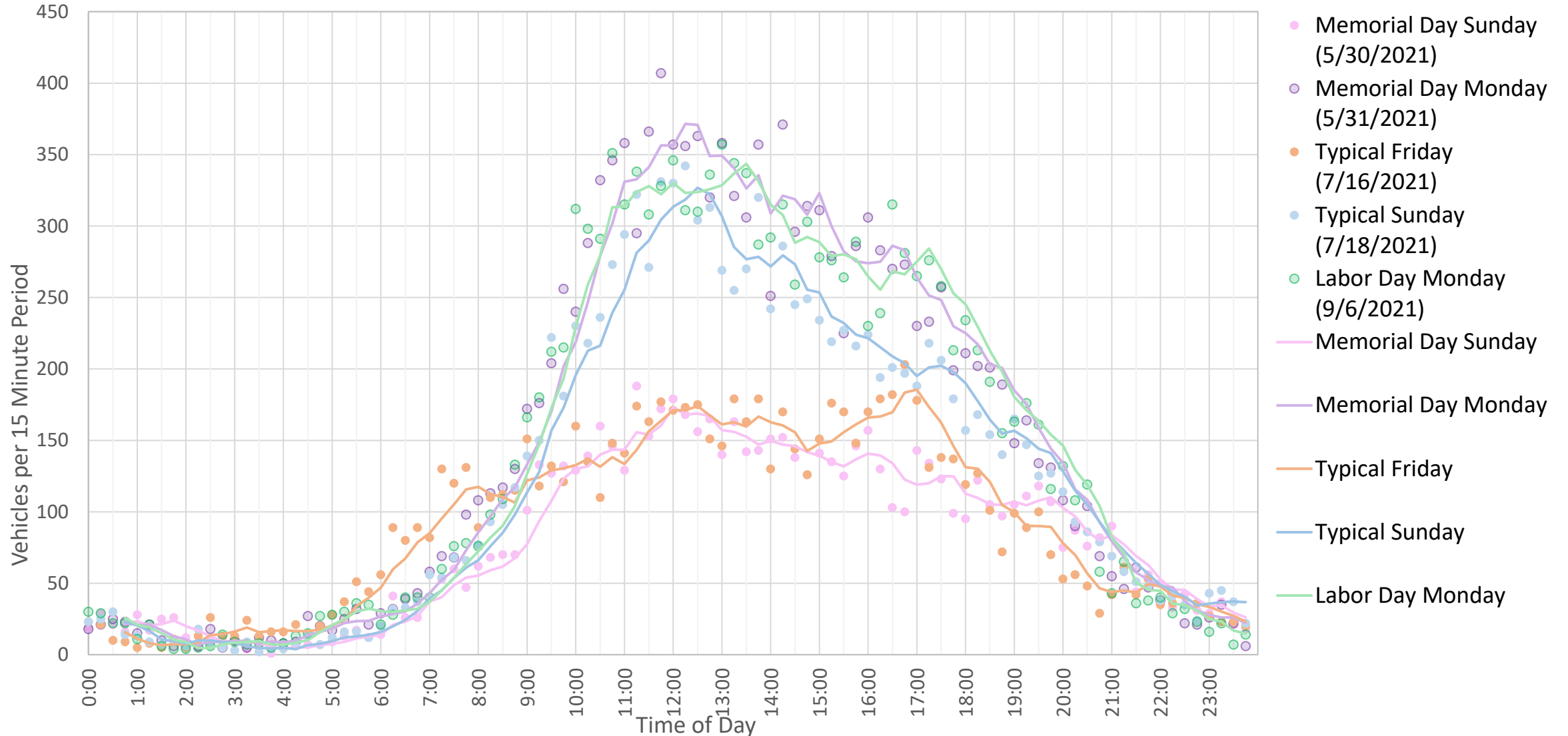
- ▶ Post Holiday / Northbound U.S. 54
  - Monday following Labor Day
  - NBR at U.S. 54 & I-70
  - ~40% influx of traffic volume



# Traffic Trends



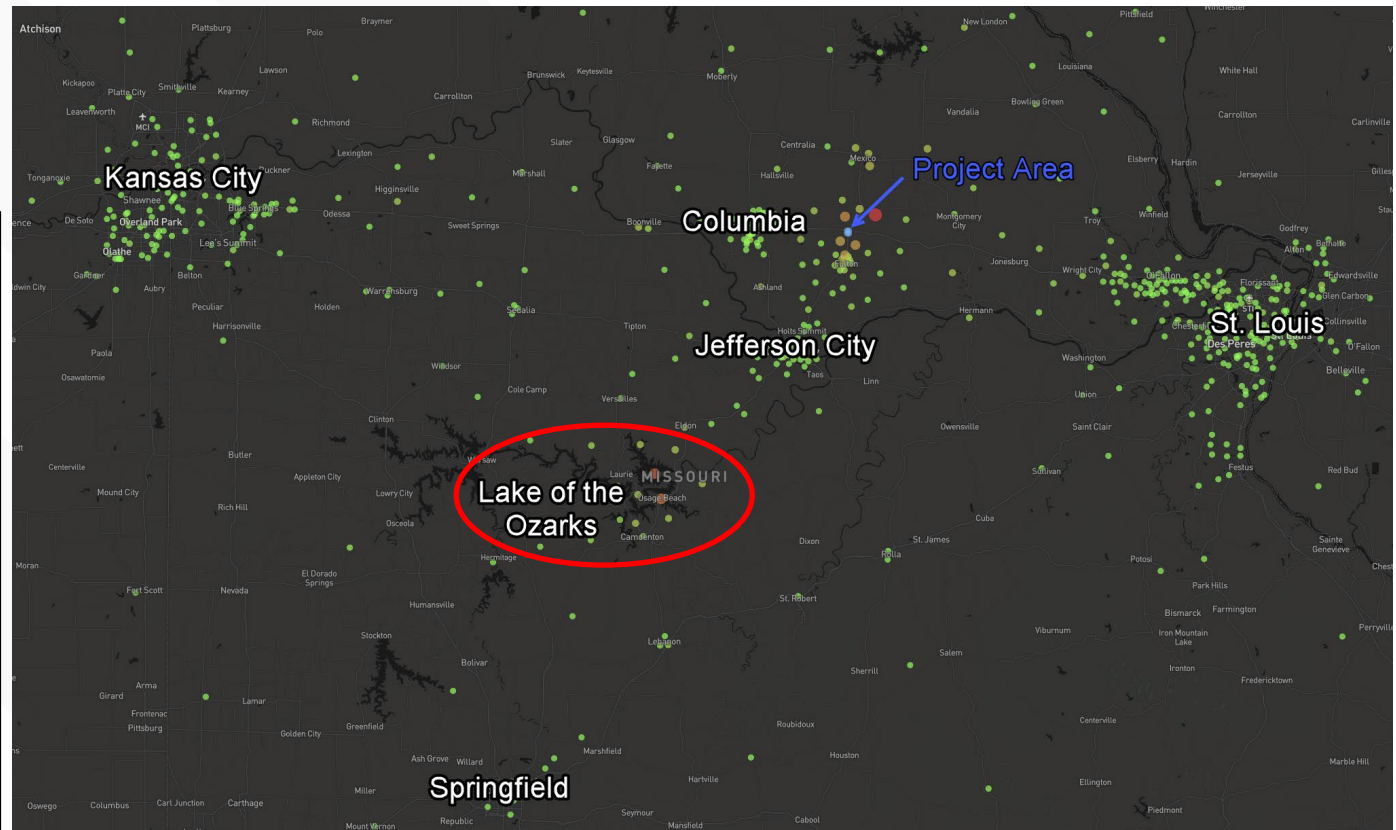
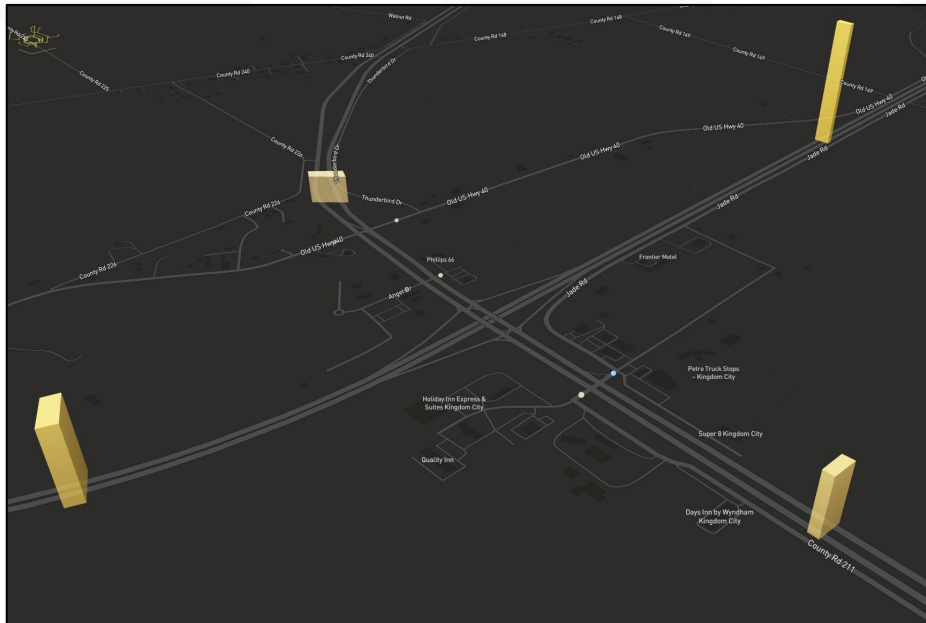
# Traffic Trends



# Regional Traffic Trends

## ► Lake of the Ozark

- I-70 WB Exit Left-Turn
- U.S. 54 NB Right-Turn at I-70



# Traffic Modeling

## ► Model Calibration

- Estimated trends using historical Gridsmart data
- Applied routing findings via Streetlight Big Data set
- Approximately 10% variance in turning movement to count estimates



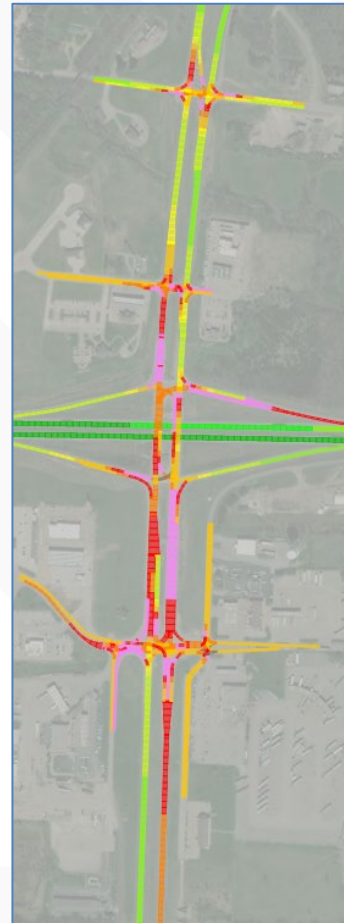
# Key Components

## ► Vissim Model Results

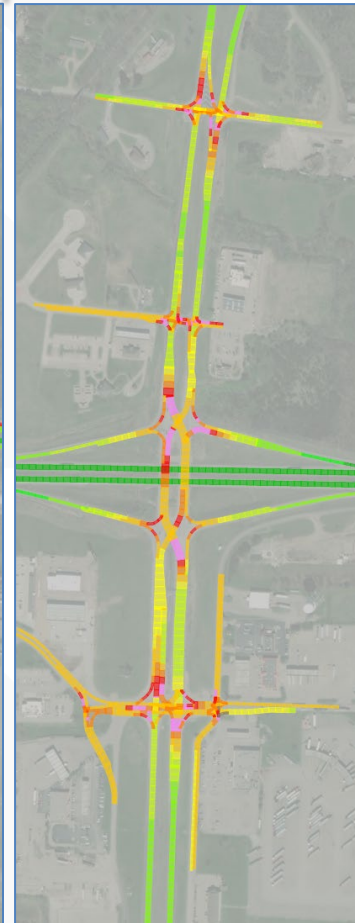
- Typical day
- Pre-holiday



**No Build  
Holiday**

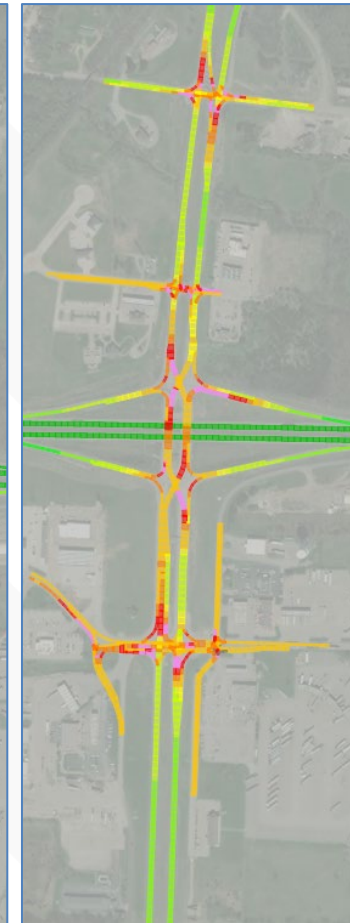


**Wed**

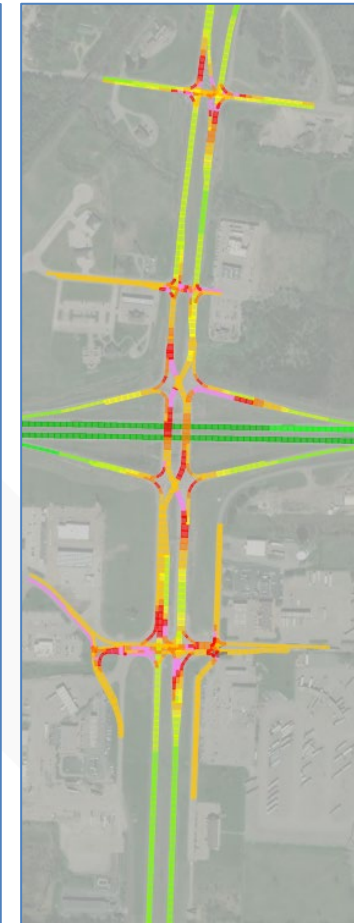


**Preferred Alternative**

**Friday**



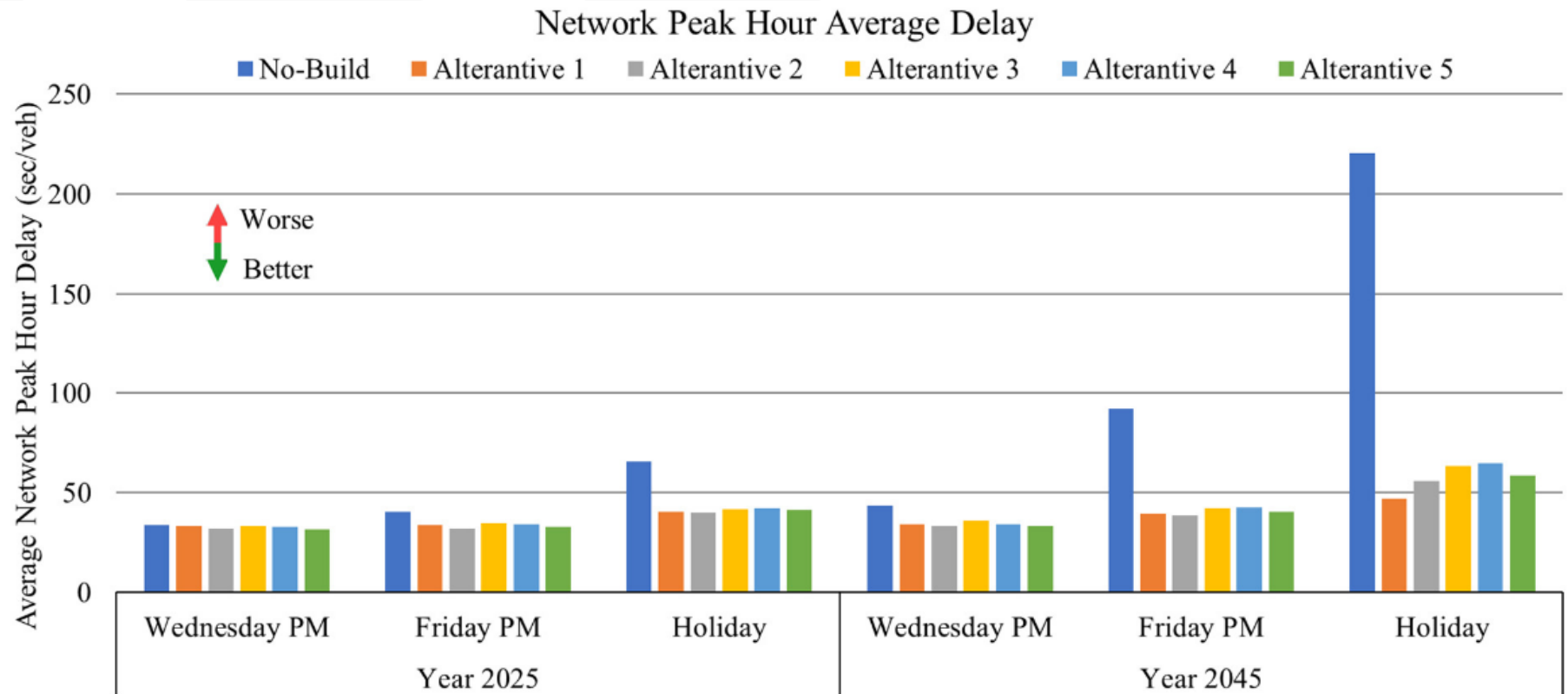
**Holiday**



# Key Components

## ► Vissim Model Results

- Typical day
- Pre-holiday



# Post Preferred Selection Modifications

- ▶ Considerations to added traffic resilience
- ▶ ~40% surge in NB U.S. 54 traffic
- ▶ Purposed for post-holiday traffic surge

**Single Lane**



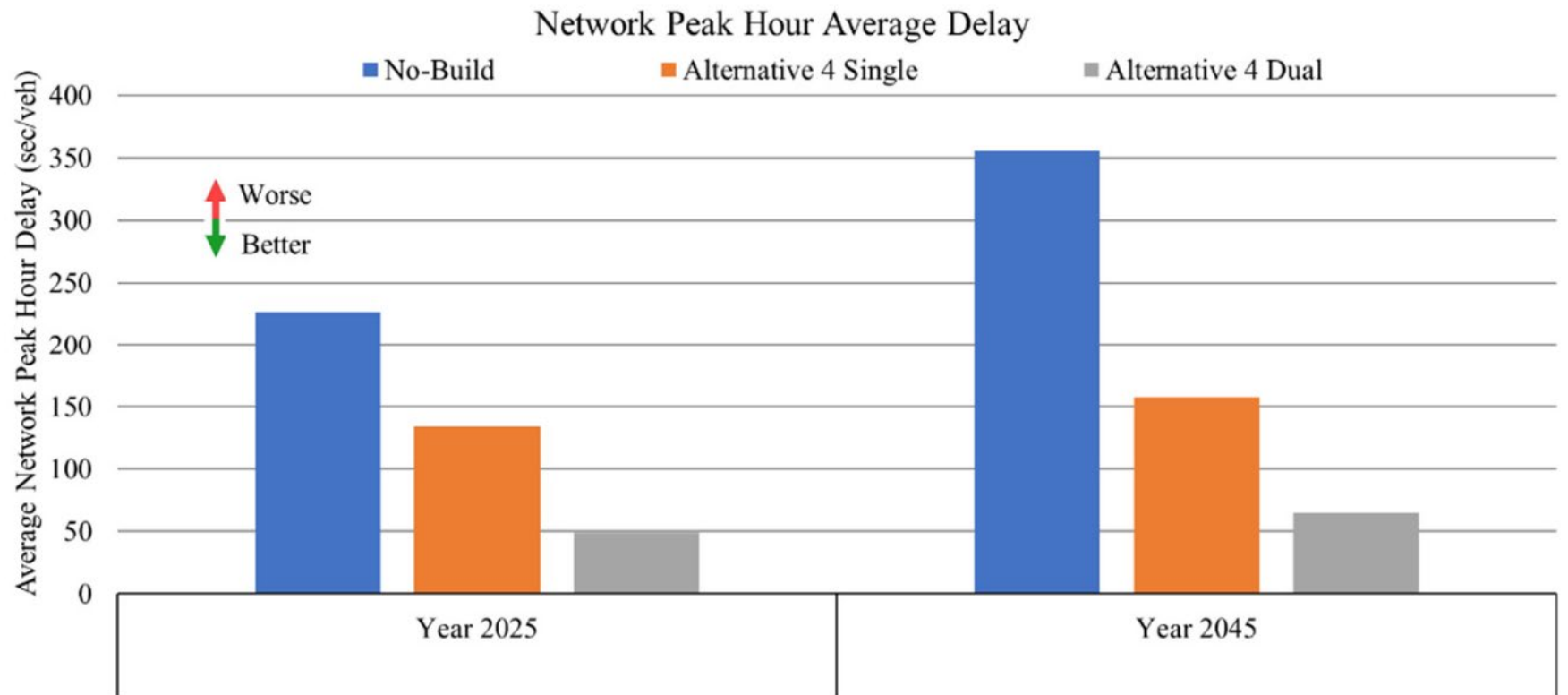
**Dual Lane**





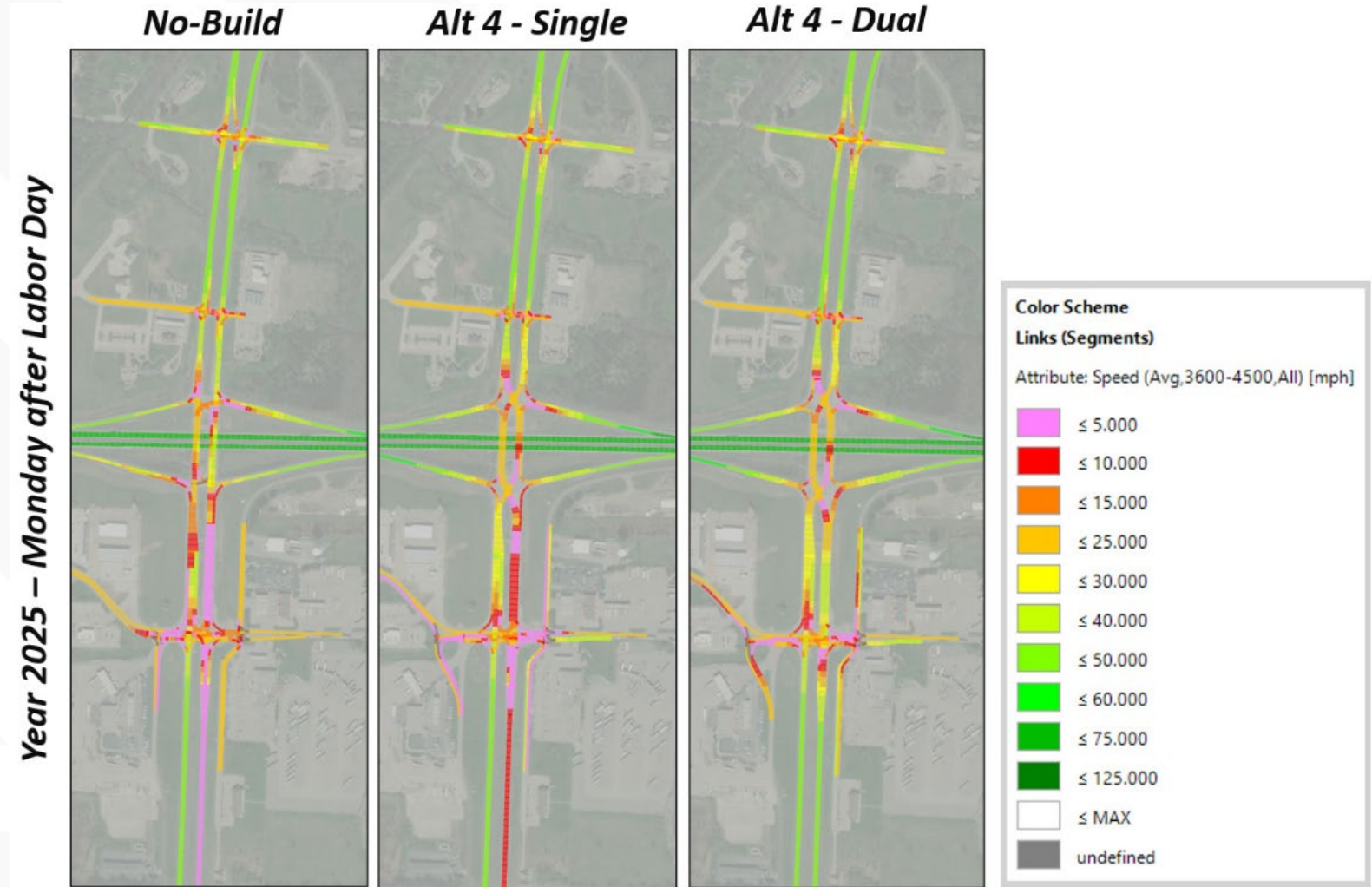
# Key Components

- ▶ Vissim Model Results
  - Post-holiday

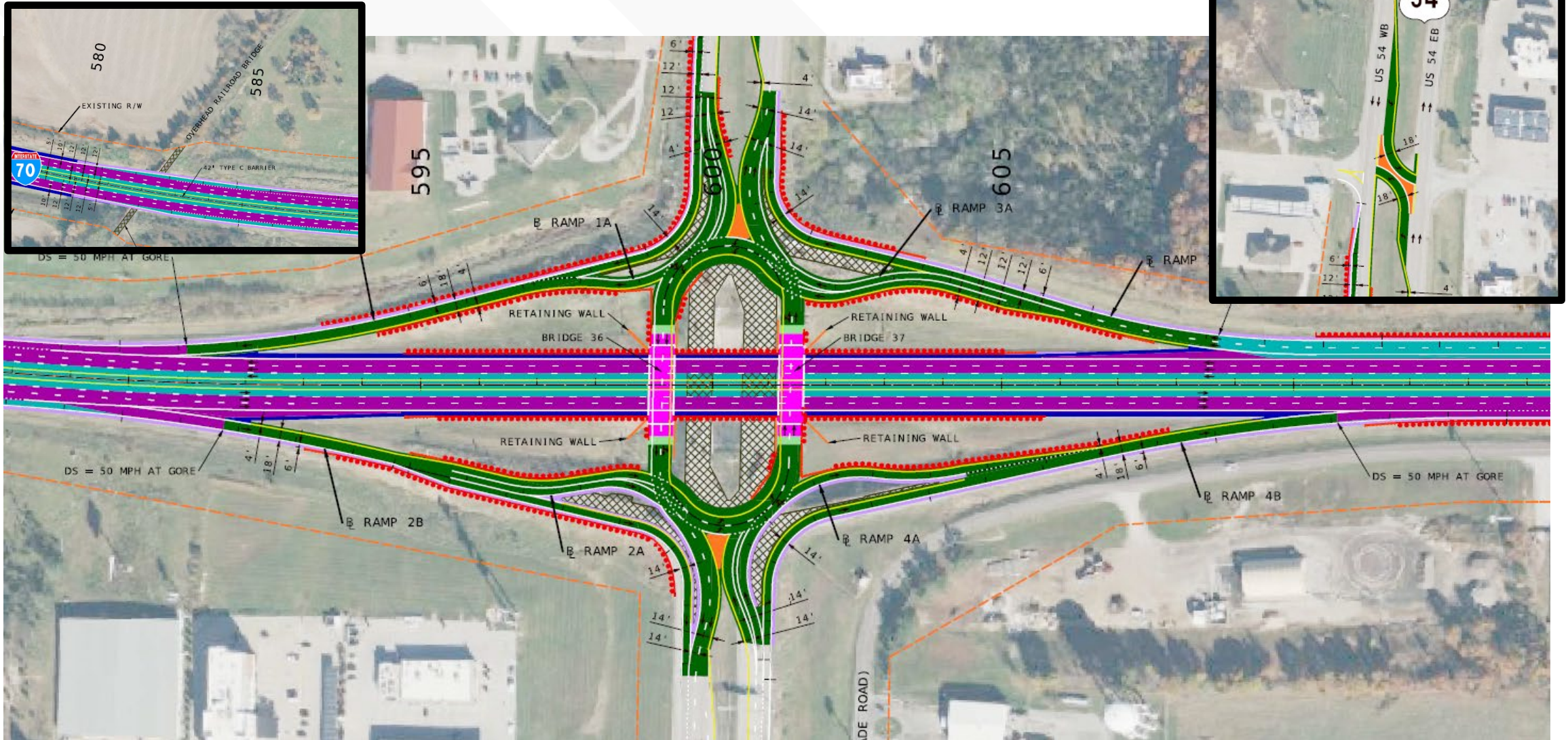


# Key Components

- ▶ Vissim Model Results
  - Post-holiday



# D/B Solution (Added Modifications Pending)



# Thank you.

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**Mike Herleth, PE**  
Burns & McDonnell



**Tim Cope, PE, PTOE**  
Burns & McDonnell